STAT1 inhibitor alleviates spinal cord injury by decreasing apoptosis

Y.X. Wu¹, C.Z. Gao¹, K.L. Fan², L.M. Yang³ and X.F. Mei³

¹Department of Spinal Surgery, Second Hospital of Shandong University, Jinan, China
²Department of Emergency, The Affiliated Hospital of Shandong University of Traditional Chinese Medicine, Jinan, China
³Department of Orthopedics, First Hospital of Liaoning Medical University, Jinzhou, China

Corresponding author: C.Z. Gao
E-mail: gaochunzheng@yeah.net

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ABSTRACT. Spinal cord injury (SCI) is typically caused by trauma or disease, and it severely affects patients’ motor function. The relationship between signal transducers and activators of transcription-1 (STAT1) and neuronal death after cerebral focal ischemia has been comprehensively studied, but its role in SCI remains largely unknown. This study investigated the protective effect of an STAT1 inhibitor on SCI. Thirty SD rats were SCI-induced and were then randomly divided into two groups (N = 15 each), either receiving STAT1 or the STAT1 inhibitor S1491 by intraperitoneal injection. The motor dysfunction of the rats was evaluated by behavioral scores, followed by the examination of SCI by hematoxylin and eosin staining. Apoptosis was also detected by Western blot and terminal deoxynucleotidyl transferase-mediated dUTP nick-end-labeling (TUNEL) assay. The motor functions of rats receiving STAT1 did not score as well as the STAT1 inhibitor group (P < 0.01). Further assays showed remarkable improvements in pathological damage to spinal code tissue in STAT1 inhibitor-treated rats, along with lower Bax and higher Bcl-2 expression.
The STAT1 inhibitor also suppressed the occurrence of TUNEL-positive cells compared to the STAT1-treated group. In summary, we suggest that the STAT1 inhibitor alleviates SCI by decreasing apoptosis.

**Key words:** Signal transducers and activators of transcription-1 (STAT1); Spinal cord injury; Apoptosis